

REMARKS

Pursuant to the present amendment, claim 28 and 31 have been amended and claims 30, 33, and 34 have been canceled. Thus, claims 1-29 and 31-32 are pending in the present application. No new matter has been introduced by way of the present amendment. Claims 33 and 34 were canceled as they are directed to a non-elected invention that was the subject of a previous restriction requirement. Applicants specifically reserve the right to pursue the subject matter defined by the canceled claims in a later filed application should they so desire. Claim 30 was incorporated into claim 28 and canceled. Claim 31 was amended to change its dependence from canceled claim 28 to claim 28. Reconsideration of the present application is respectfully requested in view of the amendments and arguments set forth herein.

The Office Action indicates that the information disclosure statement filed on 8/6/04 fails to comply with 37 C.F.R. § 1.98(a)(2). Applicants have verified that copies of the 5 documents cited in the IDS are present in the file wrapper as indicated by the Patent Application Information Retrieval (PAIR) system. Therefore, Applicants are unsure why the filed IDS is deficient. Further clarification is requested.

Claims 1-5, 7-11, 13-21, 23-32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson, et al. (3,808,068). Claims 6, 12, and 22 were determined to be allowable, but were objected to as depending from a rejected base claim. Applicants respectfully traverse the Examiner's rejections.

Independent claims 1, 9, 13, 20, and 28 include, among other things, the general feature of determining, for a selected etch tool and etch recipe, across-substrate variations in etch rate. Claims 1, 9, 13, and 20 include the additional feature of determining at least one parameter of an implantation process based on the across-substrate etch rate variations. Claim 28 includes the

additional feature of determining differences between local etch rates measured in a plurality of locations and etch rates of a second layer subject to an implantation process at the plurality of locations.

A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to assert that the invention defined by independent claims 1, 9, 13, 20, and 28 are obvious in view of the prior art of record constitutes an impermissible use of hindsight using Applicants' disclosure as a roadmap. Johnson fails to meet this standard for several reasons.

First, Johnson fails to teach determining, for a selected etch tool and etch recipe, across-substrate variations in etch rate. Johnson merely teaches that implanting a material can increase the etch rate of the material relative to the material without implantation. The etch process taught by Johnson is an isotropic wet etch, a process that is substantially non-directional in nature, *i.e.*, uniform in all directions. Such an isotropic process is not known to produce across wafer etch rate variations. Indeed, Johnson never mentions etch rate variations across the substrate only etch rate differences based on whether or not the material has been subjected to an implantation process. Hence, Johnson fails to teach or suggest determining, for a selected etch tool and etch recipe, across-substrate variations in etch rate.

Second, with respect to claims 1, 9, 13 and 20, Johnson fails to teach or suggest determining an implant parameter based on the across-substrate variations. Johnson only varies

the implantation parameters based on the desired depth of the etched feature, not based on across-substrate etch rate variations.

Third, with respect to claim 28, Johnson fails to teach or suggest measuring the local etch rate at a plurality of locations and comparing the etch rate at those locations to those of a layer subjected to an implantation step. Johnson does not compare etch rates at different locations, as Johnson does not contemplate that the etch rate changes across the substrate.

The many deficiencies described above are each fatal to the obviousness rejections set forth by the Office, since the law requires Johnson to disclose each and every element of the claimed invention. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Accordingly, Johnson fails to obviate any of claims. Applicants therefore request that the rejections of claims 1-5, 7-11, 13-21, 23-32 be withdrawn.

Claims 8, 19, and 24 are rejected under 35 U.S.C. §112 as being indefinite for failing to particularly point out a distinctly claim the subject matter which applicant regards as the invention. The specification was amended at page 16, line 24 to recite that the ions species is selected so as to have a diffusivity that is less than a predefined threshold at temperatures of subsequent manufacturing processes. Support for this amendment is found in claim 8 as originally filed, therefore no new matter was introduced.

It is commonly known in the semiconductor processing art that the degree to which ions diffuse in material to which they have been implanted varies on the species implanted and the temperature at which the material is maintained. Generally, the amount of diffusion increases with temperature. Because the rate is dependent both on species and temperature, there is not one particular diffusion threshold that can be specified for all species and temperatures, as the processing temperatures vary widely with the particular implementation of the semiconductor

device, and also the amount of diffusion that can be tolerated varies with the particular implementation. However the diffusion rates for different species at different temperatures are well known in the art. In the context of the present invention, the ion species is selected based on the knowledge of the temperatures expected during subsequent processing such that the diffusivity at that temperature is acceptable (*i.e.*, less than a predefined threshold). This consideration is further supported at page 16, lines 24 – page 17, line 3, which states “The ionic species implanted into the material layer 108, prior to etching this layer, may be selected on the basis of process requirements in manufacturing the devices on the substrate 107 and on the basis of the magnitude of influence the ionic species exerts on the specified material layer 108 upon etching this layer with the tool 100 and the specified etch recipe.” For these reasons, Applicants submit that claims 8, 19, and 24 are not indefinite and respectfully request that the rejection under 35 U.S.C. § 112, second paragraph be withdrawn.

In view of the foregoing, Applicants respectfully submit that all pending claims are in condition for allowance. The Examiner is invited to contact the undersigned at (713) 934-4070 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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